



Presented by

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SEMSIM

(Southeastern Michigan Snow and Ice Management) System



City of Detroit



Oakland Co.



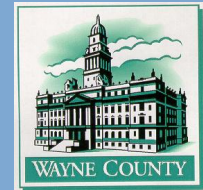
Macomb Co.



Wayne Co.

SEMSIM is:

- A partnership between the 4 largest local road agencies in Mich.
 - Road Commission for Oakland County
 - Wayne County Department of Public Services, Roads Division
 - City of Detroit Department of Public Works
 - Road Commission of Macomb County

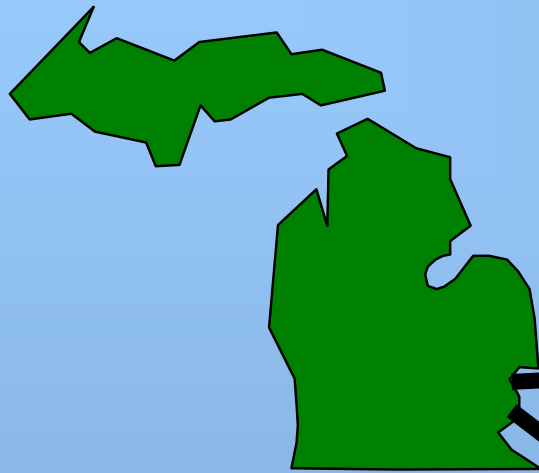


Other Partners

- SMART Bus system (radio communications backbone).
- MDOT & the Federal Highway (Federal funding)
- General Dynamics (engineering support and system maintenance)

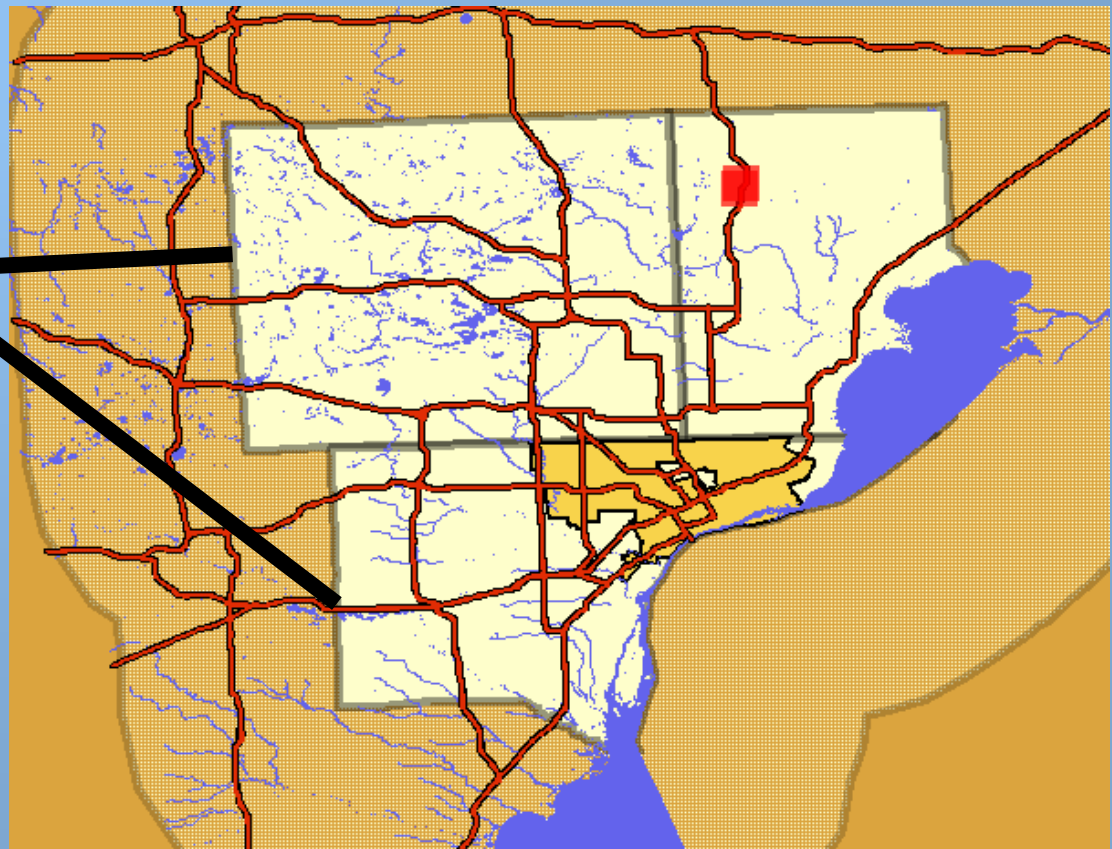


Area of Operation



Southeastern
Michigan:

- home to nearly 4 million people
- 15,000 miles of public roads



SEMSIM Goals:

- Increase motorist safety & mobility
 - Reduce road agency barriers
 - Reduce cost & environmental impact
 - Share road condition data with travelers & transit agencies
 - Create a model for other road agencies to emulate
-

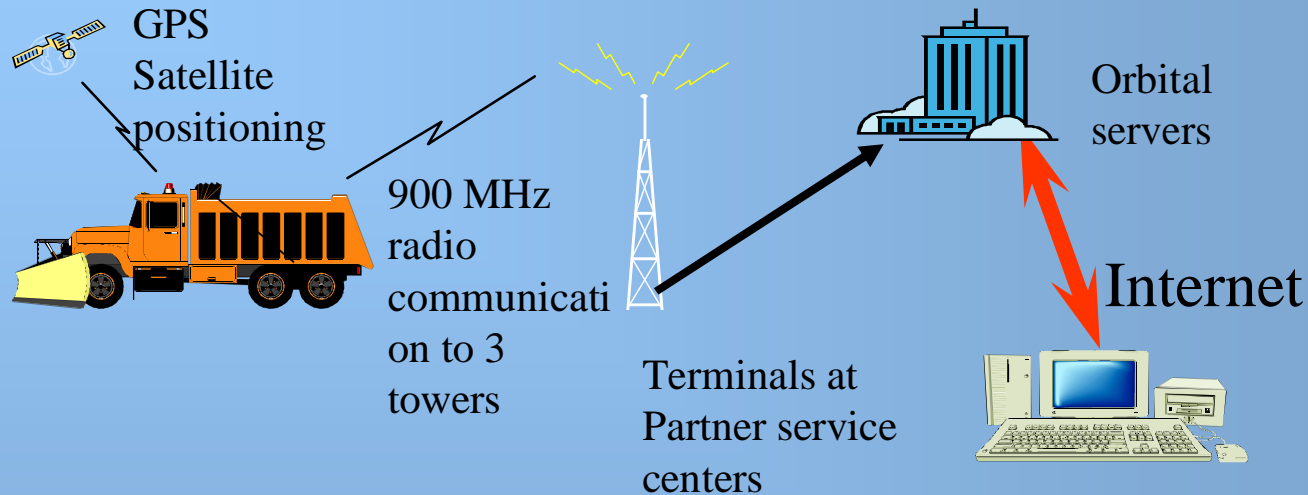
SEMSIM System

- Over 500 winter maintenance vehicles
- 36 regional maintenance centers

How is SEMSIM funded?

- \$4 million in federal earmarked funding
- \$6 million in CMAQ funding through SEMCOG
- SEMSIM Partners contributed a 20% match

How does SEMSIM Work?



- Uses Global Positioning System (GPS)
- Trucks transmit data using SMART radio system
- Orbital servers use Internet to provide map position and data to SEMSIM Partners

SEMSIM Web-Based Application

- SEMSIM largest such tracking system in US
- First Web-based winter maintenance system
- SEMSIM can be accessed anywhere in the world
- Hosted by Orbital Sciences at secure 24x7 facility

The satellite-based global positioning system (GPS):

- Allows agencies to track all trucks on a computer map.
- It shows supervisors which roads have been plowed/salted.
- Software can locate the nearest 3 trucks to a selected location.

Vehicle List

Display Vehicle Status Detail - Microsoft Internet Explorer

Vehicle Status for 007605 (Dec 8, 2003 8:26:32 AM)

Activity		Temp	
Speed(mph)	0	Air(F)	67
Heading	0	Road(F)	67
Distance(mi)	0.00	Engine	0
Type	L		

Plow		Location	
Belly	Down	Lat	42.370
Front	Up	Lon	-83.054
		Address	LAT: 42.3698368 LON: -83.054208
		Box Load(%)	0
		Mile Point	0
		DGPS	Off

Spreader Setting		Spreader Status	
Status	Off	Blast	Off
Setting	0	Sand	Off
Sand Rate	0.0	Mix	Off
Salt Rate	0.0	Salt	Off
Brine Rate	0.0	Pause	
Blast Count	0		

Day Material		Total Material	
Sand(lbs)	0.0	Sand(Ton)	0.0

Vehicle number:

Click on to get vehicle dialog box

OrbTrac - Microsoft Internet Explorer

Address: http://orbtrac.com/orbtrac/Main.jsp

Links: Woodwigk Newspps, Google, Invest, Pocket PC, Travel, Search, Yahoo! Mail, Phone books, Ebay, Veridian, Reference, SEMSIM

Time	From -> To	Message
2/16/04 11:11 AM	803-70002 1W -> FE	Out Of Service
2/16/04 9:52 AM	rconrad -> eanderson	Good Eric had trouble with Emergency Alarms last week
2/16/04 8:37 AM	eanderson -> rconrad	Hi Bob How is the system working for you?

Commands: ☐ Map ☒ Stat ☐ Msg Views: City of Detroit oven Vehicle Groups: Wayne Co

Vehicle	Time	Speed(mph)	Distance(mi)	Air(F)	Road(F)	Belly	Box Load(%)	Mile Point	Status	Salt Rate	Spreader Setting	Spreader Status	Day Mat
803-70001 2P	02/06/04 02:17 AM	0	0.00	28	26	Down	0	0	On	0.0	Off		
803-70002 1W	02/16/04 11:43 AM	0	57.42	-1	-1	Up	0	0	On	0.0	Off		
803-70004 5G	02/16/04 01:56 PM	9	37.24	32	44	Down	0	0	Off	0.0	Off		
803-70007 1W	02/16/04 01:56 PM	1	15.66	29	53	Up	0	0	On	0.0	Off		
803-70010 2N	01/27/04 10:21 AM	0	0.00	67	57	Up	0	0	Off	0.0	Off		
803-70011 2P	02/16/04 01:55 PM	0	45.78	27	40	Up	0	0	Off	0.0	Off		
803-70014 5G													
803-70016 5G	02/16/04 01:57 PM	0	29.02	28	47	Up	0	0	Off	0.0	Off		
803-70020 1W	02/12/04 02:44 PM	0	0.00	40	52	Up	0	0	Off	0.0	Off		
803-70201 5G	02/16/04 01:58 PM	13	25.24	29	42	Down	0	0	Off	0.0	Off		
803-70203 2P	12/10/03 10:04 AM	0	0.00	45	43	Up	0	0	Off	0.0	Off		
803-70209 1H	02/16/04 12:48 PM	0	158.89	30	30	Up	0	0	Off	0.0	Off		
803-70211 2P	02/16/04 01:52 PM	0	24.93	37	32	Down	0	0	Off	0.0	Off		
803-70213 5G	02/16/04 01:55 PM	9	27.27	33	41	Up	0	0	Off	0.0	Off		
803-70216 2N	02/14/04 04:48 PM	0	0.00	74	74	Up	100	0	Off	0.0	Off		
803-70218 2P	02/16/04 01:57 PM	0	23.56	34	48	Up	0	0	Off	0.0	Off		
803-70219 2N	02/16/04 10:34 AM	20	10.64	25	21	Up	0	0	Off	0.0	Off		
803-70221 1H	02/16/04 01:56 PM	31	78.25	25	33	Up	0	0	Off	0.0	Off		
803-70224 2N	02/16/04 01:58 PM	20	20.53	27	32	Up	0	0	Off	0.0	Off		
803-70226 3W	02/16/04 01:57 PM	2	49.46	27	40	Up	0	0	Off	0.0	Off		
803-70228 2P	02/16/04 01:58 PM	0	80.92	37	40	Up	0	0	Off	0.0	Off		
803-70237 1W	02/16/04 09:53 AM	30	2.45	25	22	In	0	0	Off	0.0	Off		

Loading New Map...

Start | Taskbar | System Tray | 2:04 PM

Vehicle Information Provided:

- Location
- Belly plow up or down
- Front plow up or down
- Air and pavement temperature
- Spreader status and spreader rate

Vehicle List with Map & Messages

Message to be sent to vehicle

Binoculars:

Click on to find vehicle on map.
Map is presented and map box is checked

The screenshot displays the ORBTRAC SENSIM software interface. At the top, there is a 'Message' section with a 'Time' and 'From -> To' field, and a 'Message' input area. Below this is a 'Commands' section with checkboxes for 'Map', 'Stat', and 'Msg'. The 'Map' checkbox is checked. To the right of the 'Commands' section are dropdown menus for 'Views' (set to 'Oakland Co') and 'Vehicle Groups' (set to 'Oakland Co'), and a 'Vehicle Display Time' dropdown (set to 'Since Last Month'). Below these are icons for various functions and a 'Factor' dropdown (set to '2x').

The main part of the interface is a table with columns for 'Vehicle', 'Time', 'Activity', 'Temp', 'Plow', 'Location', and 'Spreader Setting'. The table contains several rows of data for different vehicles, including A0571 S, A0572 T, A0581 S, A0582 T, A0587 T, A0592 L, and A0593 W. Each row shows the vehicle's status, location, and spreader settings.

Below the table is a map showing the geographical area covered by the vehicles. The map is a satellite view with a grid overlay. A red box highlights a specific area on the map. A date and time stamp '11/13/2007 03:42:38' is visible in the bottom right corner of the map.

On the left side of the interface, there is a 'Send Text Message' section with a text input field containing 'Clear road deck on I696 < Telegraph'. Below this is a 'Vehicle' list with a scrollable list of vehicle IDs: A0567 S, A0568 T, A0569 L, A0571 S, A0572 T, A0576 S, A0577 M, A0581 S, A0582 T, A0587 T, A0592 L, A0593 W, A0594 W, A0595 W, and A0596 S. Below the list is a 'Users' section with a dropdown menu set to 'ClintonSCo'. At the bottom left are 'Send' and 'Reset' buttons.

Map Display

The toolbar at the top of the map provides a number of ways to control and provide information from the map

Expands map to full SEMSIM area

Display vehicle information for vehicle trace clicked on

Centers map to spot where clicked

Add landmark

Show 3 closest vehicles to point clicked

Clear other tools

Zoom in & out

Expands map to show whole view

Turns traces on or off

Displays address of spot clicked

Shows position of address entered

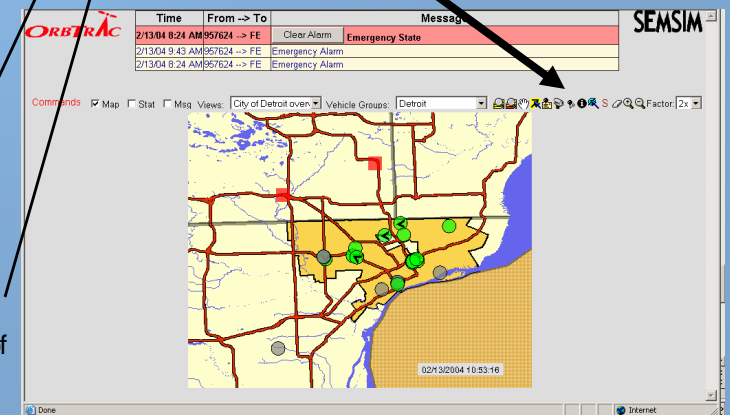
Commands ☒ Map

Street Address:

City: , or

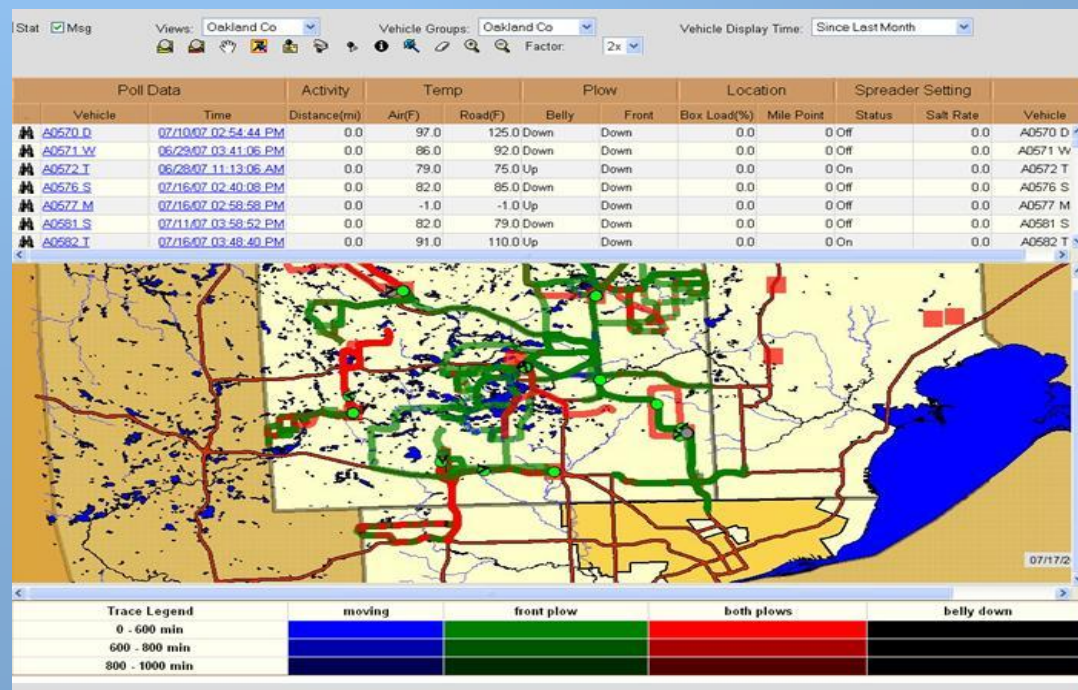
Zip Code:

Find Address



Map “traces” of a truck.

Trace colors behind vehicle indicate what the vehicle is doing (plowing, salting or just moving).



Messaging

- A freeform or canned message can be entered in the dialog box
- Select the vehicle you want the message to go to
- The users box shows who is on the system. You can also send a message to them
- Press “send” to send the message

Links Woodwkg Newsgps

Send Text Message:
Invalid Characters: " &

This is a
test message

Vehicles:

- 007600
- 007601
- 007602
- 007603
- 007604
- 007605
- 007606
- 007607
- 007608
- 007609
- 007610
- 007611
- 007614
- 007615

Users:

banderson

Send Reset

Orbitrac - Microsoft Internet Explorer

Address: http://orbitrac.com/orbitrac/login.do;SESSIONID=1H9J0fjsv2e

Links Woodwkg Newsgps Google Invest Pocket PC Travel Search Yahoo! Mail Phone books Ebay Vendors Reference SENSIM

Vehicle	Time	Speed(mph)	Distance(mi)	Air(F)	Road(F)	Belly	Box Load(lb)	Location	Mile Point	Status	Salt Rate	Salt
007600	11:05:03 07:39 AM	0	0.00	43	45	Down	0	Off	0.0	Off	0.0	Off
007601	02/13/04 08:20 AM	0	0.00	-1	-1	Down	0	Off	0.0	Off	0.0	Off
007602	01/13/04 08:07 PM	0	0.00	72	64	Down	0	Off	0.0	Off	0.0	Off
007603	02/03/04 12:26 PM	0	0.00	37	36	Down	0	Off	0.0	Off	0.0	Off
007604	02/13/04 01:51 PM	0	0.96	69	72	Down	0	Off	0.0	Off	0.0	Off
007605	12/09/03 08:26 AM	0	0.00	67	67	Down	0	Off	0.0	Off	0.0	Off
007606	02/13/04 10:33 AM	0	21.15	28	29	Down	0	Off	0.0	Off	0.0	Off
007607	02/13/04 09:22 AM	0	0.00	56	50	Down	0	Off	0.0	Off	0.0	Off
007608	02/13/04 01:56 PM	0	0.92	35	48	Down	0	Off	0.0	Off	0.0	Off
007609	02/13/04 01:56 PM	0	61.88	39	36	Down	0	Off	0.0	Off	0.0	Off
007610	02/13/04 01:51 PM	0	0.00	66	53	Down	0	Off	0.0	Off	0.0	Off
007611	02/13/04 01:56 PM	0	45.33	-1	-1	Down	0	Off	0.0	Off	0.0	Off
007614	12/16/03 08:06 AM	0	0.00	71	66	Up	0	Off	0.0	Off	0.0	Off
007615	02/10/04 01:57 AM	0	0.00	32	30	Down	0	Off	0.0	Off	0.0	Off
007616	01/22/04 03:08 PM	0	0.00	15	15	Down	0	Off	0.0	Off	0.0	Off
007620	02/11/04 12:43 PM	0	0.00	54	47	Down	0	Off	0.0	Off	0.0	Off
007621	01/20/04 06:18 AM	0	0.00	66	60	Down	0	Off	0.0	Off	0.0	Off
007622	02/11/04 10:44 AM	0	0.00	30	21	Down	0	Off	0.0	Off	0.0	Off
007623	02/13/04 01:56 PM	0	46.65	0	0	Down	0	Off	0.0	Off	0.0	Off
007624	02/11/04 10:47 AM	0	0.00	40	21	Down	0	Off	0.0	Off	0.0	Off
007625	01/24/04 05:13 AM	0	0.00	13	13	Down	0	Off	0.0	Off	0.0	Off
007626	12/14/03 05:16 PM	0	0.00	34	34	Down	0	Off	0.0	Off	0.0	Off
007627	02/13/04 01:56 PM	11	31.44	33	26	Down	0	Off	0.0	Off	0.0	Off
007628	02/13/04 01:56 PM	0	15.32	-1	-1	Down	0	Off	0.0	Off	0.0	Off
007630	02/11/04 10:00 AM	0	0.00	36	20	Down	0	Off	0.0	Off	0.0	Off
007631	02/13/04 01:56 PM	0	60.51	34	41	Down	0	Off	0.0	Off	0.0	Off
007632	02/10/04 02:09 PM	0	0.00	34	35	Down	0	Off	0.0	Off	0.0	Off
007633	02/11/04 06:34 AM	0	0.00	70	62	Down	0	Off	0.0	Off	0.0	Off

Send Reset

Playback Previous Storm Incidents

- Analyze operations
- Identify ways to improve efficiencies
- Check the exact time when specific roads were plowed or salted



In-Vehicle Communications

Display allows management & drivers to quickly communicate non-verbally much like email



- Send type written messages to drivers
- Drivers respond with one-touch, preset messages

Air & Road Temperature Sensor

Located on the
driver's side
mirror



- Records air temperature
- Uses infrared sensor to measure pavement temperature

Front Plow Sensor



- Monitors whether plow is up or down
- There is also a sensor on the underbody scraper (“float” blade)

Computerized Salt Spreaders



- Spreader controller provides salt usage to SEMSIM system

Interagency Cooperation

- SEMSIM Partners can help in emergencies. (Bridge icing, accidents)
- SEMSIM Partners can communicate with each other through messaging system.

Preparing Employees

To minimize employee opposition to SEMSIM, the Partners:

- Provided group and individual training
- Answered questions about how SEMSIM was to be used
- Emphasized SEMSIM as an efficiency & safety tool, not a disciplinary tool.

What's next for SEMSIM?

- Improved reports
- Truck engine data
- Integration of information with traffic operations
- Adjustable spread rate based on the temperature sensor
- Dynamic routing

Lessons Learned

Training

Training

Training

1. Make it as “hands-on” as possible
2. Be realistic with expectations
3. Be patient -- Stay positive
4. Listen to suggestions from Operators
5. Start out with a limited number of vehicles

Lessons Learned

There will always be unforeseen complications with new technology.

1. Compatibility of equipment.
2. Implementation will take longer than you expect.
3. High-tech projects are a constant battle (obsolete software and hardware)
4. Select champions.

Lessons Learned

- Have a full-time, on-site project manager
- Visit other agencies doing similar projects:
 - The SEMSIM Partners visited:
 - Minn. DOT
 - IOWA DOT

Potential Year-round Improved Efficiencies:

Designed for winter road maintenance, SEMSIM can improve:

- Pothole patching operations
- Gravel road grading/brine application
- Work planning
- Monitoring contractors
- Etc.

Thank You

Questions?

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